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Homology of Total DNA From Stem Rust Pathogen and Wheat Varieties with Varying Resistance

18400149 Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 23, No 5, Sep-Oct 87 (manuscript received 24 Apr 86) pp 657-663

[Article by O. A. Monastyrskiy and A. A. Dedyukhin, Northern Caucasus Scientific Research Institute of Phytopathology, Krasnodar]

[Abstract] A study was made of the homology of total DNA of biotype 6 of 21 stem rust races (Puccinia graminis Pers.) with the total DNA of varieties of wheat both resistant and susceptible to stem rust, as well as the content of guanine-cytosine (GC) pairs in the total DNA taken in the study of the fungal biotype and the wheat specimens. The results indicate that molecular hybridization of the DNA of the wheat and the stem rust pathogen, together with a certain content of GC pairs in their DNA can be used to estimate the resistance of varieties of wheat to the disease and to study the mechanisms of resistance and susceptibility. References 48: 14 Russian, 34 Western.

06508

Composition of Lipids of Phytophthorosis Pathogen and Their Ability to Induce Potato Phytoalexin Accumulation

18400148a Moscow BIOKHIMIYA in Russian Vol 52, No 9, Sep 87 (manuscript received 1 Aug 86) pp 1445-1453

[Article by L. I. Chalova, S. A. Avdyushko, O. L. Ozeretskovskaya, S. V. Khotimchenko and N. A. Romashina, Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow; Institute of Marine Biology, Far Eastern Science Center, USSR Academy of Sciences, Vladivostok]

[Abstract] The authors have previously isolated the active potato protective reaction inducer from the phytophthorosis pathogen Phytophthora infestans, a lipoglycoprotein complex consisting of 60% lipids, 35% carbohydrates and 5% protein. It was found that the inducing activity of the complex is related to the presence of the lipids. This article studies the composition and biological activity of lipids included in the complex to determine the active principle. The active substance was found to be C-20-polyunsaturated fatty acids, eicosatetraenoic (arachidonic) and eicosapentaenoic acids, potent potato phytoalexin biosynthesis stimulants present in both neutral and polar lipids from the complex. The greater portion of these acids is present as glycerolipids. The differing activity of the individual classes of lipids may be explained by the fact that their hydrolysis occurs at different intensities depending on the presence of the corresponding acylhydrolases in the plant. Figures 3, references 31: 9 Russian, 22 Western.

06508

Separation of Alpha-Latrotoxin by High Performance Liquid Chromatography

18400142a Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 59, No 5, Sep-Oct 87 (manuscript received 30 Sep 86) pp 93-97

[Article by E.I. Grebinozhko and A.N. Nikolayenko, Institute of Biochemistry imeni A.V. Palladin, UkSSR Academy of Sciences, Kiev]

[Abstract] α-Latrotoxin, the chief component of Latrodectus mactans tredecimguttatus (black widow spider) venom, was first isolated and partially characterized in 1976. Further research indicated that this protein has membranotropic activity with respect to the presynaptic membrane, making it an important instrument in the study of neurosecretory mechanisms. It has recently been discovered that α-latrotoxin forms ion channels in presynaptic membranes, through which calcium ions enter the presynaptic terminals to cause a merging of the synaptic vesicles with the membrane. Taking note of the lability of α-latrotoxin, an express method was developed for separating it using liquid chromatography with an FPLC chromatography system ("Pharmacia", Sweden) and a so-called rapid carrier such as "Mono Beads" or "Toyopearls". The separated protein, consisting of a polypeptide of 130 kDa molecular weight, does not differ in physicochemical or physiological properties from previously described α-latrotoxin. Figures 5; references 14: 6 Russian, 8 Western.

12765

Effectiveness of Cryoprotective Action of Glycerin and Polyethylene Glycol on Plasma Membranes

18400142b Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 59, No 5, Sep-Oct 87 (manuscript received 13 Dec 86) pp 97-99

[Article by V.V. Ryazantsev and A.K. Gulevskiy, Institute for Problems in Cryobiology and Cryomedicine, UkSSR Academy of Sciences, Karkov]

[Abstract] The great significance of micro-surroundings of plasma membranes in the mechanism of their cryoprotection has been noted previously. Solutions of certain salts and proteins, which freeze as hydrates in the membrane spaces, facilitate preservation of the structure-function state of plasma membranes during deep freezing. Data supporting the capability of these substances (whose molar concentration is low) to partially prevent disruption of barrier functions of isolated membranes at low temperatures, make it possible to hypthesize that by using traditional cryoprotectors, cryoprotection of membranes can also be achieved under conditions of much lower concentrations than that of their cryoprotection in cell composition. To check this hypothesis, a study was made of the status of the barrier function in the membranes of reconstituted erythrocytes subjected to freezing and thawing and protected with cell-permeable glycerin or cell-impermeable polyethylene glycol at concentrations of 0.5 to 30%. The limits of barrier function loss in erythrocyte membranes during freezing were determined by using tracer substances, spectrophotometry, and flame photometry. It was demonstrated that effective cryoprotection of isolated erythrocyte membranes during freezing and thawing can be achieved at much lower cryoprotector concentrations (5 to 10 times lower) than in cryoprotection within the cell composition. Figures 2; references 6: 4 Russian, 2 Western.

12765

Synthesis of C-Terminal Heptadecapeptide of Salmon Calcitonin II

18400138a Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 9, Sep 87 (manuscript received 17 Jul 86) pp 2117-2124

[Article by G.P. Vlasov, V.R. Glushenkova, O.V. Glinskaya, L.B. Nadezhdina, T.A. Komogorova and I.B. Ditkovskaya, Institute of High Molecular Weight Compounds, USSR Academy of Sciences, Leningrad]

[Abstract] In a previous work the N-terminal portion (peptide 1-15) of the hormone salmon calcitonin II was synthesized. In the present work the protected C-terminal heptadecapeptide (16-32) of salmon calcitonin II was synthesized using a classical approach with minimal group protection to avoid difficulties involved with deblocking of the terminal peptide. Thirteen fragments of the C-terminal portion of the calcitonin hormone were synthesized and the necessary conditions were determined for joining them and purifying the protected heptadecapeptide 16-32. Figure 1; tables 2; references 11: 2 Russian, 9 Western.

12765

Synthesis of Fragments of beta-Chain of Human Hemoglobin. Report 12. Solid Phase Synthesis of Polypeptide Corresponding to Sequence (57-100)

18400138b Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 57, No 9, Sep 87 (manuscript received 7 Jul 86) pp 2127-2136

[Article by M.V. Sidorova, G.A. Zheltukhina, A.S. Molokoyedov, Ye.I. Filippovich and R.P. Yevstigneyeva, Moscow Institute of Fine Chemical Technology imeni M.V. Lomonosova]

[Abstract] The 44-member fragment of the beta-chain of human hemoglobin corresponding to the (57-100) amino acid sequence was synthesized in the solid state for the purpose of studying interaction of heme with peptides. This peptide acts as a so-called protein "pocket" for localizing heme and includes a number of functionally important amino acid groups, such as proximal histidine, distal histidine and valine. It also participates in the fixation of oxygen and lysine molecules. The (57-100) polypeptide was synthesized by condensation of 16 amino acid fragments onto polystyrene grafted to teflon

by radiation. The synthesis started with 16.8 grams of tripeptidyl polymer containing 2.6 millimoles of the corresponding tripeptide. The initial tripeptide group was added on to a bromomethylated carrier in the presence of dicyclohexylamine. To prevent side alkylation of the unprotected imidazole ring of histidine, the remaining halogen in the tripeptidyl polymer was substituted with a 6-fold excess of cesium acetate in dimethylformamide. Figures 4; tables 2; references 13: 7 Russian, 6 Western.

12765

Macroheterocyclics. Report 27. Amidomethylation of Benzocrown Ethers

18400139a Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIYE in Russian No 8, Aug 87 (manuscript received 31 Mar 86) pp 1039-1042

[Article by N.G. Lukyanenko, V.N. Pastushok, L.Ye. Tonya and R.G. Kostyanovskiy, Physicochemical Institute imeni A.V. Bogatskiy, UkSSR Academy of Sciences, Odessa]

[Abstract] Although much work has been devoted to alpha-amidomethylation at the carbon atom, data are still lacking on the use of benzo-crown ethers in such reactions, and only a few examples are cited on using PFK (expansion unknown) as catalyst. However, PFK is known to be an excellent solvent and catalyst in the alkylation and acylation of benzo-crown ethers. In the present work it is demonstrated that benzo-crown ethers are subject to alpha-amidomethylation with N-hydroxymethylphthalamine and N-hydroxymethylamide in PFK. Analysis of the molecular model shows that only two amidomethyl substituents can be introduced to the aromatic ring in the benzo-crown ether at the 4 and 5 positions. This was confirmed by the fact that when dibenzo-18-crown-6 and dibenzo-24-crown-8 are amidomethylated with two equivalents of N- hydroxymethylphthalimide, a mixture of products is formed, while at 1:4 ratio of crown ether to electrophilic reagent and 100 deg temperature, corresponding tetraphthalimidomethyl derivatives are formed in high yield. Diphthalimidomethyl derivatives were synthesized from benzo-15-crown-5 under similar conditions. The reaction temperature may be lowered to 70 deg by using the more reactive N-chloromethylphthalimide as electrophilic reagent. Seven crown ethers were synthesized. Table; references 8: 4 Russian, 4 Western.

12765

Mechanism of Physiological Action of Crown Ethers on Excitable Structures

18400139b Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 33, No 5, Sep-Oct 87 (manuscript received 11 Dec 85) pp 106-109

[Article by T.A. Savenko, Ye.I. Nazarov, V.G. Vongay, A.I. Undrovinas, T.V. Biryukova and N.G. Lukyanenko, Odessa University imeni I.I. Mechnikov, Ministry of Higher and Middle Specialized Education UkSSR; Physicochemical Institute imeni A.V. Bogatskiy, UkSSR Academy of Sciences, Odessa; All-Union Cardiological Science Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Certain crown ethers manifest pronounced anti-arrhythmic properties on a strophanthinic simulation of arrythmia. Two explanations have been advanced: the inhibition of conductivity of ion channels in electrically excited membranes, and the effect on the mechanism of sodium-calcium metabolism in the sarcolemma of cardiomyocytes. A study was made of the applicability of these suppositions to explain the counteracting mechanism of crown lactones in the development of strophanthinic arrythmia. The effects of crown lactone on an electrically excited membrane were investigated by studying the incoming sodium current in isolated cardiomyocytes. Isolated cells were placed into a specially made V-shaped plastic pipette with a 7 micron orifice which was placed in a chamber containing the sodium solution. Sodium-calcium metabolism in the sarcolemma of the cardiomyocytes was studied with radioactive isotopes. The resulting shift in potential of stationary activation and deactivation of sodium currents of cardiomyocyte sarcolemma by 10-15 mV cannot determine the anti-arrhythmic effect of crown lactone. It was concluded that the counter action of crown lactone on disrupted cardiac activity resulting from strophanthin is not related to the modified permeability of an electrically excited membrane, but rather with the counter action of calcium ion cell overloads due to inversion of sodium-calcium metabolism. Figures 3; references 12: 6 Russian, 6 Western.

12765

Study of Catalytic Properties of Cholesterol Oxidase in the Reaction of Cholesterol Oxidation in Aqueous-Organic Media

18400148b Moscow BIOKHIMIYA in Russian Vol 52, No 10, Oct 87 (manuscript received 8 Oct 86) pp 1696-1703

[Article by Ya. A. Aleksandrovskiy, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Modern methods of determining cholesterol are based on its oxidation catalyzed by cholesterol oxidase. This reaction is also a satisfactory model of the system of kinetic studies of enzymatic processes involving hydrophobic (cholesterol) and hydrophilic (cholesterol oxidase) reagents. This article studies the influence of organic solvents used to prepare the homogeneous reaction medium on the catalytic properties of cholesterol oxidase in oxidation of cholesterol. The studies indicated that in the area of investigation of the relationships between an organic solvent and a buffer solution, the primary effect of the organic solvent is not directed toward the protein catalyst, but rather toward formation of certain properties in the micellar structures of the cholesterol, thus defining its substrate properties in the reaction catalyzed by cholesterol oxidase. The composition of the reaction mixture influences organization of the cholesterol micelles which determine the cholesterol

substrate properties in the reactions. Oxidation of cholesterol in the reaction occurs at the interface between the aqueous and organic phases. Figures 4, references 15: 4 Russian, 11 Western.

06508

Immobilization of Invertase in Polyvinyl Alcohol Coating

18400148c Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 23, No 5, Sep-Oct 87 (manuscript received 5 Nov 85) pp 595-599

[Article by O. G. Kuznetsova, Ya. D. Zytner, V. G. Shmeleva, L. S. Tikhonova and K. A. Makarov, First Leningrad Medical Institute]

[Abstract] Immobilization of invertase is used in biotechnology to produce invert sugar and also in analytic systems to determine sucrose. This article studies the possibility of immobilizing invertase in a polyvinyl alcohol (PVA) coating formed directly on the surface of an electrode due to electrolinking of PVA in the presence of boric acid. The activity of coatings obtained under galvanostatic conditions was greater than that of coatings obtained under potentiostatic conditions due to the greater mass of the coatings obtained. The greatest enzymatic activity was observed in coatings produced at low current densities, less than 4 mA/cm^2, such that inactivation of the enzyme was compensated by its increasing content in the film due to the increased mass of the polymer coating. Potentiostatic conditions of electrochemical immobilization of invertase in a polyvinyl alcohol coating are suggested with potential E=-2.1 to -2.3 V, time 15-30 sec. Figures 3, references 10: 6 Russian, 4 Western.

06508

Device for Cell Fusion and Electroporation

18400225 Moscow TASS in Russian 10:30 GMT 26 Jan 88

[Text] Soviet scientists have created a device which can "weld" the cells of tissues without disturbing their vital activity. This was reported to a TASS correspondent at the Electrochemistry Institute of the USSR Academy of Sciences. The device, the size of a small television set, produces electric impulses by which the cells are processed. Specialists have used the cells of plants and animals in experiments. It turned out that the most convenient and promising subject of research were bacteria. The device can unite two bacteria with totally different properties into one without disturbing the vitally important processes taking place in them. Within a short period of time such a double cell divides, but the newly formed daughter cells are, as a rule, unlike their "parents" in their properties. Specialists used this circumstance to obtain completely new bacterial cells with properties set beforehand. They hope to use them for medical purposes, for producing, for example, proteins, amino acids and other compounds which are used in medicine, agriculture and the chemical industry, and for cleansing sewage of pollution.The device can not only "weld" cells but also pierce small orifices in their membranes, through which, according to the wishes of the experimentor, the most diverse substances can be introduced, in particular, stimulators.

07310

Cellular Engineering at Ukrainian Botanical Institute

18400261 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Mar 88 p 4

[Article by Yu. Chirkov, doctor of chemical sciences]

[Abstract] Cellular engineering—which involves the transplantation of the genes of one cell into another—is being conducted in the department of cytophysiology and cellular engineering of the UkSSR Academy of Science Institute of Botany in Kiev. Yuriy Yuryevich Gleba, the first person in the Soviet Union to produce cellular hybrids capable of producing offspring, is directing the work. Gleba's work has included far-ranging experimentation, such as the crossing of tobacco cells with human cells. Cellular engineering entails stripping the cells with cellulase, which removes the rigid polysaccharide shell that impedes the union of the cells. The stripped cells are called protoplasts. Special techniques are then used to make the cells fuse into a single organism—a new cell.Researchers have thus far produced a potato-tomato hybrid, as well as hybrids such as jimsonweed-henbane, goutweed-carrot, and even soybean-blue tobacco. Few, if any, however, have been brought to the stage of a full-fledged fruit-bearing plant, or a flowering plant, or even a rooted plant. The cellular engineers hope to cross rye with tundra moss. Some of the research that has been done could be called exotic. The researchers, for example, isolated the gene the produces the light in a firefly and then inserted it into a tobacco cell. The tobacco began to produce luciferin, and the plant glowed in the dark.One of the most promising areas of cellular engineering is the hybridization of domesticated species of plants and wild species. Cross-breeding with traditional methods generally results in the qualities of the genetically stronger wild species overpowering the desirable qualities—for example, taste—of the domesticated species. Cellular engineering, which works at the gene level, should be able to obviate that problem. A recent success recorded at the institute was the joining of wheat protoplasts.

13227

New Wound Dressing—Gelevin

18400254 Moscow IZVESTIYA in Russian 1 Mar 88 p 3

[Article by L. Ivchenko: "Bandage...with Powder"]

[Abstract] Chemists at the scientific-production association Plastpolimer in Leningrad and medical researchers at the Institute of Surgery im A. V. Vishnevskiy have developed a new wound dressing that comes in powder form—gelevin. Sprinkled in a thin layer on an abscessing wound, it remove microbes from the surface, thereby promoting healing. Gelevin is said to be better than the Swiss preparation Debrizan [debrizan]. Specifically, one gram of gelevin is said to absorb 18 grams of fluid, as opposed to 4.5 grams absorbed by the same amount of the Swiss preparation. Unlike the Swiss preparation, gelevin forms no crust. Nor does it stick to the wound. Gelevin is applied as often as once a day or as infrequently as once every three days, depending on the condition of the wound. The cleansing and healing of the wound is said to take place 5-6 days sooner. Gelevin has a cross-linked polyvinyl alcohol base. It is a powerful hemostatic and antihydropic. The scientific-production association is producing only small quantities at the moment, which are being tested in several clinics. Plans are for gelevin to be manufactured by the Tatkhimfarmpreparaty enterprise in Kazan. Because Soviet science is said to frequently outstrip Soviet production potential, the profound interest that foreign firms are said to be displaying in the preparation—that they are ready to work with the USSR in any way—could speed production along.

13227

Computerized Differential Diagnosis of Cerebral Insult

18400146a ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian Vol 87, No 9, Sep 87 (manuscript received 15 Aug 86) pp 1290-1293

[Article by Yu. S. Tunyan, G. O. Bakunts, Ye. L. Melikyan and A. G. Sarkisyan, Scientific Research Group for the Study of Vascular Pathology of the Brain (Headed by Professor L. S. Tunyan), Central Scientific Research Laboratory, Yerevan Medical Institute]

[Abstract] The experience gained in creating computerized diagnostic tables in various clinics in the Soviet Union is summarized in order to facilitate creation of an automated multistage system for differential diagnosis of acute cerebral circulatory disorders in dialogue mode on a micro- or minicomputer. A program was written in Assembler to run on the "Elektronika 60" microcomputer and tested in the Department of Cerebral Circulatory Disorders, Yerevan Emergency Clinical Hospital. The system was designed to provide consultative assistance in determining the nature and location of a cerebral insult in the prehospital emergency treatment stage. The system diagnoses whether an insult is present and whether it is a hemorrhage or cerebral infarction, and recognizes the location of the focus of hemorrhagic and ischemic insults. Studies of actual cases, including postmortem results, indicated that in the prehospital stage diagnostic accuracy was 17%, in a specialized hospital department — 90%, computer diagnosis — 92% in the stage of determining the nature of the acute cerebral circulatory disorder. With ischemic insult, the accuracy of physicians' diagnosis in a specialized department was 86%, with hemorrhagic insult - -92%. The effectiveness of computer diagnosis was 90% with infarct, 94% with cerebral hemorrhage. In the stage of determining the location of an insult, based on histories of 65 patients, the effectiveness of diagnosis by physicians in the prehospital stage was 6%, the accuracy of clinical diagnosis by specialists — 85%, of computer diagnosis — 87%. References 13: Russian.

06508

Demand for Cobra Venom Increases

18400256 Tashkent PRAVDA VOSTOKA in Russian
12 Feb 88 p 4

[Article by I. Lein, correspondent for Pravda Vostoka: "Living Medicine 'Factories'"]

[Text] The emblem of medicine is a snake entwined around a chalice into which milligram droplets of precious venom fall.

For some reason, you liken their movements to the calculatingly careful movements of a sapper. A herpetologist likewise has no room for error. But there is, however, a big difference: the sapper eliminates danger, the herpetologist turns that danger to good. Those milligrams will save someone's life. The yellowish substance—which grows, imperceptible to the eye, in a small, oddly shaped, transparent dish—is the result of movements that took herpetologists Yuriy Chikin and Babakul Radzhabov years to master and is valued in international markets more highly than gold.

And in our country, too, the demand for snake venom is huge. Dozens of letters and telegrams arrive at the Institute of Zoology and Parasitology of the UzSSR Academy of Sciences from pharmaceutical enterprises, scientific-research laboratories, and hospitals—requests for venom. And to the most remote, unpopulated regions are sent expeditions of herpetologists.

The amount of venom manufactured by the living "factories" depends on "external data": the length of the snake and its nature—whether it is aggressive or more or less docile. Five cobras yield one gram. And twelve gyurzas [gyurza] also yield a gram. But the small sand efa [efa] is beyond compare.

It might seem that this procedure, repeated hundreds or even thousands of times, presents no danger to the experience man. Using special sticks to retrieve the next "donor" from its box-home, Yuriy Chikin, with a sure movement, grasps the snake behind its head, which is pinned down with one of the sticks. It opens its mouth wide, the herpetologist presses a pedal with his foot, and an electrical discharge occurs. On the glass dish appears an amber drop.

But it's not all as simple as it might appear to be at first glance. Quite recently, Yuriy Chikin found that out for himself. How a gyurza bit him when he was "milking" it he just couldn't figure out. He did everything, it seemed, like he had done it a thousand times before, and then something he didn't think could happen—the snake's tooth punctured the skin of his finger. He was injected with the serum immediately, but he was ill for some long months after that. When, after his recovery, he drew venom again for the first time, he felt like a tiger- or lion-tamer entering the cage after disobedient beasts had attacked their trainer. But he overcame his fears, and again he had absolute presence of mind and the precision of movement not unlike that of an automaton.

The "milk yields" are recorded in a log. Now it's venom-keeper Galina Krivosheina's turn. A fourth-year student in the biology department of the university, she has been working already for two years. A special technology exists to store the venom for scientific research and for use by pharmaceutical factories.

The demand for snake venom had grown so much that it has become necessary to protect the cobra, which is now listed in the Red Book. Fifty snake species are found in our country, ten of them poisonous. Snake hunters walk dozens of kilometers in the mountains and ravines, looking for snakes. You need a license for that. And often you can't get them to give you one. Something of a paradox has come about. No one knows exactly how many snakes there are in Uzbekistan. A cadaster for the animal kingdom there has never been compiled. The republic's forestry ministry, in an effort to protect the natural environment and not allow the balance to be disturbed there, doesn't take any kind of "census" of the desert population. As a result, some snake species that have multiplied in such numbers that they should be trapped can't be hunted, because no one knows exactly how many of them there are. And dozens of letters and telegrams that say something like "In connection with the low reserves of snake venom, we request permission to hunt..." come in addressed to the combined production and procurement operations at the Uzbek hunting and fishing association Fazanye, where professional snake hunters work. Like the Tverdokhlebov brothers, Vladimir and Viktor. But snake hunting is against the law, and you can be fined.

Yuriy Chikin studies how snakes breed: how and with what frequency they produce offspring, what the conditions of incubation are, and what the optimal temperature and humidity are. All this is studied in the serpentarium that was established at the institute. Those who work at the serpentarium must be Doctor Aybolit [Aybolit is a fictitious doctor in children's literature who can cure anything] with the snakes.

"Taking venom," says Yu. Chikin, "is stressful to the snake. And if the snake becomes ill, we stop using it, and we give it a ration of tetravit—a vitamin complex."

The task is not simple—to learn to take venom and at the same time extend the snake's lifespan as much as possible. But the living medicine "factories" must work without stopping, because the demand for production is growing. Researchers in Magnitorgorsk and Barnaul are conducting experiments to develop and use the medicinal preparation viprosal. Kirov, Tallin, Sevastopol, and Leningrad represent a broad geographical expanse of consumers of the Tashkent serpentarium.

The combined production and procurement operations of the Uzbek hunting and fishing association Fazanye and the serpentarium of the academy's institute are the principal supplier of what turns out to be an ever-so-valuable raw material for the pharmaceutical industry. Its potential, however, is artificially limited by all kinds of prohibitions and instructions that paralyze initiative, deprive the state of considerable financial resources (exporting venom has good prospects), and keep sector science "on a diet," placing all kinds of often unjustified obstacles in the path of increased procurement and delivery of snake venom.

...Senior herpetologist Yuriy Chikin was bent over the table with his colleague Babakul Radzhabov. The count of "milked" snakes today already exceeds thirty.

The chalice fills by the gram, giving people health and life. 13227

Effect of Piracetam on Resistance of Higher Nervous Activity to Informational Overloads

18400140 SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 127, No 2, Aug 87 pp 385-388

[Article by L.G. Chkhubianishvili, GSSR Academy of Sciences, Institute of Physiology imeni I.S. Beritashvili; presented by Academician S.P. Narikashvili 21 Apr 86]

[Abstract] Although piracetam is a cyclic derivative of a natural metabolite of the nervous system, gamma-aminobutyric acid, it does not belong to any known group of medications. Its chief properties are: lack of reaction with adrenergic, cholinergic, serontoninergic or histaminic structures of the brain; lack of effect on respiratory or cardiovascular systems; absence of side effects. Since piracetam is used clinically to treat and prevent many neurological diseases, a study was made of the effects of piracetam on the resistance of higher nervous activity to informational overloads. In the present work higher nervous activity pathology was simulated in dogs by unfavorable joining of three factors: a set volume of information subject to treatment and assimilation, chronic lack of time for such work by the brain, and high behavioral motivation. The pathology arising under these conditions was named informational neurosis. The study was carried out on six mature dogs in a 7 X 6 square meter room by a motor-feed method of situational conditioned reflexes. The sources of conditioned irritants were spaced at the same distance on a 20 square cm platform in the center of the room 4 meters from the feed bins. Reinforcement was maintained with pieces of meat from three feed bins spaced 3.5 meters apart. After confirming the conditioned reflex reaction to the sound of a rotating disk of the feed bins, conditioned reflex runs were established for feed bin No. 1 to a tone of 600 Hz, feed bin No. 2 to 120 beats on a metronome and feed bin No. 3 to a bell. Intensity of the sound signals was maintained at 60-65 db. Conditioned signals were sounded in random order. The intervals between imposing the conditioned irritants were determined from the time taken by the animals to return to the starting platform after eating the food. Three dogs were administered a dose of 20 mg per kg of piracetam per os daily for 2-3 months, and the other three dogs were the control group with no piracetam administered. No changes in behavior were observed in the first group of animals, while the control animals lost the conditioned reflexes during the early stages of informational neurosis. Apparently, prolonged (over 2 months) administration of piracetam causes no side effects in dogs on their bodies or higher nervous activity. References 5: 4 Russian; 1 Western.

12765

Use of Middle Asian Cobra Venom to Modulate the Adrenergic Process

18400145a Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 73, No 9, Sep 87 (manuscript received 31 Oct 86) pp 1175-1181

[Article by B. N.. Manukhin, T. P. Kichikulova and A. T. Berdyyeva, Laboratory of Intercellular Interactions (Headed by B. N. Manukhin), Institute of Developmental Biology imeni N. K. Koltsov, USSR Academy of Sciences, Moscow]

[Abstract] After finding no data in the literature on the effect of cobra venom on the adrenergic reaction, the authors studied the effect of the venom of the middle Asian cobra (Naja oxiana) on the kinetics of the adrenergic reaction and noradrenaline content in an isolated small intestinal segment, i.e., on post- and presynaptic stages of the adrenergic process. Experiments were performed on Wistar white rats. Isolated small intestine sections in a thermostated chamber were exposed to the venom and the reaction recorded in isotonic and isometric modes. Changes in the reaction to noradrenaline upon exposure to the venom depended on concentration of both substances. The effect of the venom was always irreversible. The kinetics of the reaction of the small intestine to the α-adrenomimetic phenylephrine under the influence of the venom changed in the same manner as the reaction to noradrenaline. The cobra venom has a significant influence on both pre- and postsynaptic stages of the adrenergic process, the content of noradrenaline being reliably decreased by a maximum of 30%. Reducing the concentration of the venom by two orders of magnitude only very slightly reduces its effect, indicating that the cobra venom acts only on a certain pool of noradrenaline in the adrenergic neuron. The cobra venom acts on the β-adrenergic reaction as a mixed inhibitor. Its influence on the reaction of the intestine to noradrenaline and the α- adrenomimetic is much more complex. In general, the results indicate that the cobra venom acts only on a certain structure in the pre- and postsynaptic cells. The cobra venom has a nonspecific influence on the adrenergic process, i.e., it is not related to direct interaction with adrenoreceptors or noradrenaline pools. This is one significant difference from bonding by the venom of H-cholinoreceptors, with which it forms a specific and irreversible complex. The modulating effect of the cobra venom on the adrenergic reaction is apparently mediated through the cell membrane. The effect of the venom on the adrenergic process is a special type of nonspecific modulation which appears with a change in the functional properties of the cytoplasmic membrane. The venom can be used in a study of the variation of the adrenergic process with the functional and morphologic status of the cell membrane. Figures 4, references 19: 13 Russian, 6 Western.

06508

Contracting and Relaxing Effects of Substance P on Canine Airway Musculature

18400145b Leninggrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 73, No 9, Sep 87 (manuscript received 2 Jul 86) pp 1227-1233

[Article by I. L. Tayvan, Latvian SSR Pulmonology Center (Headed by V. V. Utkin), Riga]

[Abstract] A study is presented of the mechanisms of the bronchoconstrictive and bronchodilating effect of substance P. Experiments were performed on 18 dogs. Bronchial muscle tonus was measured by estimating changes in the dynamic extensibility of the respiratory system, tracheal muscle tonus by recording tracheal collar pressure. The results of the study showed that substance P administered i/v may cause either contraction or relaxation of airway musculature, depending on the initial status of the airway. Tracheal contraction is partially caused by changes in vagal tonus, which may result from the direct influence of the peptide on brain stem neurons. Substance P may also interact with pulmonary sensory nerve receptors. Contraction of the trachea and bronchi in response to substance P also results partially from interaction with local cholinergic mechanisms. Relaxation was partially adrenergic in origin. Substance P can liberate histamine from mast cells in the submucosal layer of the airway. Furthermore, fragments of peptide compounds generated during metabolism of the compounds may have the opposite reaction to that of the full molecule. Another mechanism might be liberation of a relaxing factor from lung tissue by substance P. Figures 4, references 15: 3 Russian, 12 Western.

06508

Probable Mechanism of Action of Bombesine on Thermoregulation

18400145c Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 73, No 9, Sep 87 (manuscript received 29 Jan 87) pp 1272-1274

[Article by A. T. Maryanovich, I. V. Gayvoronskiy, Ye. V. Kudryavtseva, I. L. Kuranova and S. I. Churkina, Department of Normal Physiology (Headed by V. I. Medvedev), Military Medical Academy imeni S. M. Kirov; Department of Chemistry of Natural Compounds (Headed by V. F. Martynov), State University imeni A. A. Zhdanov, Leningrad]

[Abstract] Administration of bombesine causes peripheral blood vessel dilation and results in a rapid drop in body temperature. Vasodilation was noticed in the first minutes after administration of the preparation to rabbits, indicating that the effect of bombesine on

peripheral vascular tonus is mediated by nerve mechanisms. This article studies the significance of these mechanisms in the peripheral vasodilation caused by bombesine. Studies were performed on six male chinchilla rabbits at an air temperature of 20-22°C. Denervation of the ears caused significant expansion of blood vessels: vein diameters increased by an average of 530 μm, or 126%. Administration of bombesine caused additional expansion of the vessels in the ears by an additional 170 μm, or 40%, for a total increase in cross-sectional area of the veins of a factor of 7.09. These results indicate that the peripheral vasodilation caused by bombesine cannot be explained by the influence of peptide on regulation of the tonus of the corresponding vessels by the central nervous system. Injection of bombesine causes additional expansion of the vessels in a denervated area, possibly due to an increase in systemic blood pressure. However, other authors have reported that bombesine does not influence blood pressure. Figure 1, references 11: 5 Russian, 6 Western.

06508

Platelet Aggregation Mechanisms Induced by Staphylococcal Toxin

18400143a Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 5, Sep-Oct 87 (manuscript received 28 Jul 86) pp 35-37

[Article by G. Ye. Brill, Department of Pathologic Physiology (Headed by Professor N. P. Chesnokova), Saratov Medical Institute]

[Abstract] Staphylococcal toxin is a membrane-damaging toxin which has an altering effect on various cells in tissue cultures and in vivo. Intravenous administration of the toxin to rabbits causes development of thrombocytopenia due to aggregation of platelets and their subsequent destruction. The specific mechanisms causing the aggregating effect of staphylococcal toxin on thrombocytes are not known. This article studies the significance of endogenous ADP and the products of metabolism of arachidonic acid and calcium-dependent systems during induction of thrombocyte aggregation by staphylococcal toxin. Experiments were performed on 20 rabbits. Addition of the toxin to thrombocyte-rich plasma obtained by centrifuging at 120g for 10 minutes caused an increase in light transmittance, indicating aggregation of platelets after a latent period of 2.4 minutes. Mutual modulation of the aggregation effects of ADP and the toxin indicated saturation of ADP-specific thrombocyte system receptors and/or complete involvement of mechanisms activated by ADP in aggregation. Addition of more toxin, however, causes a second, steeper wave of aggregation with a shorter latent period, indicating that ADP and the toxin have different molecular mechanisms of aggregation. Activation of arachadonic acid metabolism with the formation of endoperoxides and prostaglandins is an important element in the initiation of thrombocyte aggregation. Preincubation of thrombocytes with acetylsalicylic acid slightly inhibited toxin-induced aggregation, as did addition of acetylsalicylic acid during aggregation, indicating that activation of arachidonate metabolism is not a leading and necessary element in the aggregating effect of the toxin. Increasing the permeability of the cytoplasmic membrane of the blood platelets for Ca ions is an important stage in induction of aggregation. Small doses of EDTA inhibit aggregation, larger doses block it completely. The mechanism apparently includes two key aspects: formation of verapamil-resistant calcium channels in the thrombocyte membrane and liberation from the membrane of a factor which activates the platelets. References 15: 4 Russian, 11 Western.

06508

Disruption of Energy Metabolism in Experimental Botulinal Poisoning

18400143b Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 5, Sep-Oct 87 (manuscript received 9 Oct 86) pp 79-81

[Article by V. V. Morrison and V. A. Lyubayev, Department of Pathologic Physiology (Headed by Professor N. P. Chesnokova) and Histology (Headed by Professor I. K. Kapinosov), Saratov Medical Institute]

[Abstract] The botulism toxin blocks liberation of the mediator in cholinergic synapses, preventing the nerves from acting on the skeletal muscles. Continuing their studies of the pathogenesis of botulism, the authors investigate the status of energy metabolism in various types of skeletal muscle during the course of poisoning. The development of the disease is accompanied by significant changes in energy metabolism, altering certain specifics of the metabolism of adenyl neucleotides in the "fast" and "slow" skeletal muscles. A creatine phosphate deficit arises in muscles of both types, as well as an early decrease in the content of the second substrate of the creatine kinase reaction, which activates energy metabolism and stimulates the synthesis of ATP in oxidative phosphorylation and glycolysis. References 13: 6 Russian, 7 Western.

06508

Estimating the Influence of Arginyl Vasopressin on Formation of Conditioned Active Avoidance Reaction in Rats

18400144a Moscow ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian Vol 37, No 5, Sep-Oct 87 (manuscript received 20 May 86) pp 922-928

[Article by S. A. Titov and A. B. Nikonova, Combined Laboratory for Study of Means and Methods to Control Plant Pests and Diseases, Moscow State University imeni M. V. Lomonosov]

[Abstract] Various interpretations have been published concerning the mechanism of action of vasopressin on processes occurring in the central nervous system. This article analyzes the effects of arginyl vasopressin on the dynamics of development of the active avoidance conditioned reaction and seeks methods for optimal estimation of the specifics of the action of this hormone on behavior. Experiments were performed on 102 male white rats, half of which received 0.001 mg/kg arginyl vasopressin in aqueous solution each day after a learning session; the control animals received distilled water. Active avoidance was developed in a wire floor cage using electrical stimulus through the floor. The conditioned stimulus was an electric bell, the conditioned reaction was jumping onto a shelf. Arginyl vasopressin has a stable positive influence on generation of the conditioned defensive skill. The positive influence was most clearly seen when evaluated according to the Δ characteristic, an individual characteristic of each animal, the ratio of the change in behavior achieved at a given point in the experiment to the maximum change achieved throughout the experiment. The use of the dynamic Δ characteristic as a function of time provided the greatest information concerning the change in behavioral reaction, clearly showing the directionality of the process and individual nature of the response. Arginyl vasopressin did improve the development of the conditioned active avoidance reaction and decreased the variability of the individual rates of learning of the experimental rats. Arginyl vasopressin did not influence the dynamics of short-latent avoidance or intersignal reactions in the process of generation of the active avoidance reaction. Figures 3, references 9: 4 Russian, 5 Western.

06508

Information Significance of Frequency and Irregularity of Respiratory Rhythm During Physical and Emotional Stress in Man

18400144b Moscow ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian Vol 37, No 5, Sep-Oct 87 (manuscript received 5 Feb 86) pp 975-978

[Article by Yu. Ye. Vagin, Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Creation of a new method for measurement of irregularity in respiratory rhythm has now allowed estimation of changes in the nature of respiration by both qualitative and quantitative methods. The use of the method allows investigation of emotional stress in animals in various functional states. To determine whether respiratory irregularity is related to changes in human functional activity and which aspects of the activity it reflects, the authors studied respiratory irregularity and frequency during physical and mental stress in 14 human subjects performing physical exercise, plus 12 more doing memorization tasks. The results of the experiments were processed using a Norwegian "Mikron-2000" computer. Correlation analysis of the experimental results indicated that the increase in respiration frequency under physical stress varied with the stress as was expected. Respiratory irregularity varied individually for each subject, and no correlation was found between the increase in respiratory irregularity and increase in physical stress. Neither respiratory frequency nor irregularity correlated reliability with the number of words memorized in the mental test. The positive component of respiratory irregularity did vary with the strength of motivation in the mental test. The increase in respiratory frequency therefore reflects physical stress, while nonuniformity represents motivational-emotional stress in man. An integrated index considering nonuniformity and the results of motivated activity, can evaluate the possible motivational-emotional stress. Figures 2, references 5 Russian.

06508

Hematology Service in Current Stage of Development

18400137 Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 32, No 10, Oct 87 pp 3-9

[Article by V.V Kochemasov, A.P. Rzhanovich, and V.F. Kobelyatskiy, Hematology and Blood Transfusion Central Scientific Research Institute, USSR Ministry of Health, Moscow]

[Text] The task of effecting an an all-out acceleration of scientific-technical progress and a radical improvement in the quality indicators and efficiency of production was stipulated at the 27th CPSU congress and subsequent CPSU Central Committee plenums. Plans were set forth to implement programs including the improvement of Soviet public health by accelerating development of the economy, and the task of restructuring the national economy (primarily by economic production management methods), introducing progressive forms of production, and intensifying operations by using existing resources was formulated. These tasks are directly linked to the operation of the country's hematology service, whose activities are of a production nature. Unless it becomes possible to radically change the main forms and methods of the hematology service's operation during the present five-year-plan, there will be a discrepancy between the service's capabilities in the production sphere and the quality with which transfusion services are rendered. Despite the fact that the hematology service by and large meets public health needs for the transfusion of whole blood, its material and technical base is lagging behind from a development standpoint, and it does not have adequate modern hardware and equipment to process blood into components and preparations. This has resulted in a situation wherein a portion of donors' blood is not being used effectively.

Therapeutic institutions do not have enough thrombocyte and leukocyte stores, and the sections of complexes and laboratories that fractionate blood into preparations only have the capabilities to process part of the plasma that is needed according to norms. The absence of an adequate amount of high-speed centrifuges and polymer containers for preparing blood components is holding back the rates at which donors' plasma is prepared by the plasmapheresis method.

The insufficient production of the main types of hardware and equipment is the main reason why the country's hematology service is lagging behind from a material and technical standpoint.

The main principle of material stimulation—reward for fulfilling the main production indicators, i.e., provision of fundamental transfusion equipment to treatment institutions—is essentially absent in the existing system of rewarding institutions in the hematology service.

In a number of republics planned quotas for the production of antistaphylococcal and antihemophiliac plasma, cryoprecipitate, and leukocyte and thrombocyte mass have not been established. The plasmapheresis method is being introduced slowly.

The Republic Hematology and Blood Transfusion Scientific Research Institutes [NIIGPK] and institutions in the hematology service have not paid enough attention to developing and popularizing new transfusion therapy methods. In the past few years, for example, a number of new transfusion agents have been developed and introduced. These include new blood substitutes and biologic preparations. The list of transfusion aids currently consists of 30 products. Up until now, however, clearly insufficient attention has been given to the issues of popularizing their use with different types of pathology. The program to train students at medical higher educational institutions in clinical transfusion therapy remains at a low level.

The organizational aspects of the production of blood preparations is increasingly acquiring the features inherent to industry. Blood transfusion stations [SPK] having fractionation facilities do not meet production requirements from the standpoint of labor conditions. The list of duties and occupations and labor norms needs to be reexamined. Not enough attention has been paid to problems of labor protection and safety engineering, and recommendations concerning benefits for workers in toxic production areas must be developed.

Violation of production discipline, inadequate control over the production process, and failure to observe general production, regulatory, and sanitary requirements are the most frequent causes of unacceptable production and a reduction in production efficiency.

Introducing scientific-technical progress in the area of planning and managing the hematology service's production activity is one of the most important tasks entailed in improving the hematology service's production activity. In the current five-year-plan we must therefore take measures to improve planning and management of the hematology service's production activities and introduce into the service's operation such economic concepts as cost accounting and self-support of production. The distinctive features of the hematology service as a budget sector do not yet make it possible to accomplish all of these tasks in the manner in which they are accomplished in industry. The time has come, however, to develop a program to improve the hematology service's production activity on the basis of a system of natural indicators. The principal features of the hematology service's existing planning system and possible programs to manage transfusion equipment reserves have been studied. Analysis has shown that the existing system for planning the production activity of institutions in the hematology service do not meet modern needs and have significant shortcomings. These shortcomings are related to the absence of centralized planning and to the absence

of scientifically established methods of formulating the individual indicators in a plan on the one hand and planning the production activities of the hematology service's institutions as a whole on the other hand. This in turn leads to the incomplete use of raw materials and to over- and underestimations of the volumes of donor blood products and plasma. The complexity of the problem arises from the fact that there is no normative base for planning and the existing system of material stimulation results in the adoption of plans that are not very intensive. For this reason, the main task now is to conduct an analysis of the economic and managerial activities of the hematology service and to introduce scientifically established methods of planning production activity and methods of monitoring the fulfillment of the plan's quotas.

This work should result in a management automation system for the country's hematology service that is capable of meeting the treatment and prophylactic institutions' needs for blood and blood components and preparations in a rational manner. The planning method should be reinforced by a well-founded and purposeful system of material stimulation because the lack of normative documents regulating the technical and economic stimulation of workers in the hematology service is not facilitating any interest on the part of blood transfusion station workers in putting new technology to use or producing new types of products.

Development of a new planning system based on the use of existing production capabilities is just being completed in the central and Leningrad NIIGPK.

In the first stage, planning is based on the existing system of natural indicators (a product list containing products and the volumes in which they are produced) with a substantiation of the plan's indicators.

The plan being formulated is balanced with respect to volumes of production and raw materials and is geared toward making maximal use of production capabilities and satisfying the normative needs of treatment institutions. Two main principles—satisfaction of the treatment institutions' need for transfusion media and maximum utilization of production capabilities—thus constitute the basis of the newly developed planning method. Introduction of this new planning system will only be possible if a new system for the material stimulation of blood transfusion station workers is also introduced.

Reassessment of the organization of the staff structure at blood transfusion stations is an important aspect of our work. The USSR Ministry of Health decree specifying this structure, which has been in effect for nearly 20 years, has generally proved itself. Indeed, in the 1960's and 1970's, it served as the foundation on which the network of the hematology service was created and its structure and principal production characteristics specified. In view of the fact that the hematology service's tasks, functional responsibilities, and product list have all expanded in the past few years, it has, however, become necessary to reexamine the existing manner in which staff organization is structured at the blood transfusion stations.

The draft of the decree that is currently being developed specifies the mandatory product list of components and preparations. Seventeen items are included on the list. Distinct parameters for using the plasmapheresis method to prepare plasma are established. The structure of the blood transfusion stations has been compiled with an allowance for all of the new forms of operation that have been introduced in the past few years. New staff norms for fractionating plasma, which depend on production volumes, have been developed for blood transfusion station personnel as well as for departments and sections of complexes.

The decision was made to conduct an economic experiment in working out a cost accounting system in the hematology service. The purpose of the experiment was to discover new forms of activity for a blood transfusion station as a production enterprise. An appropriate policy concerning the economic experiment was prepared. Within the framework of the experiment it will be possible to debug labor expenditure norms for the production of blood components and preparations and develop a rational system for economic stimulation. The main purpose of the experiment is to attain a substantial increase in production output while maintaining existing amounts of financing and existing size limits by improving planning and the material stimulation system, which should be directed, above all, toward stimulating the processing of blood into its components and preparations.

The situation regarding the material and technical base has become serious. In the past 15 years, the total amount of blood products has been increased through a continual increase in the hematology service's production activity and the development of free blood donation. The production volume of blood components and preparations nevertheless remains less than that required by the treatment network. At the same time, the material-technical and hardware capabilities of the blood transfusion stations in a number of union republics are limited from the standpoint of increasing the processing of blood.

The production of highly effective blood preparations—immunoglobulin for intravenous injection, cryoprecipitate, concentrations of coagulation factors VIII and IX—is being introduced slowly. This is due to the inadequate activity of the NIIGPK and unsatisfactory control over the blood transfusion stations' operation.

Because of the expanded production of blood preparations that has occurred during the past few years, a number of regions have experienced a disproportion in the volumes of blood plasma products. In some republics

there is a surplus and constant increase in the quantity of plasma being prepared while there is a shortage in others. This results in a disproportion between the potential to process plasma and the current capabilities. The introduction of centralized planning and management of donor plasma resources at the all-union and republic levels must be accelerated so as to eliminate the existing discrepancy between the raw material potential of the hematology service's institutions of certain of the country's territories and the production capabilities that have been created in them during the past few years. The time has come to solve this difficult problem. We cannot become resigned to a situation in which some regions of the country have a surplus of plasma while in other regions the hematology service's capabilities are not being used to full capacity. This is also true of the production of blood preparations in such cities as Gori, Samarkand, and Kuba. At the same time, however, the hematology service of the RSFSR has experience in transferring and making planned deliveries over great distances from suppliers to blood transfusion stations that process plasma by the fractionation method. This operating experience should be introduced in other republics.

Centers to manage blood reserves that would coordinate mutually beneficial raw material exchange operations to allow for its efficient and timely processing must be organized by republic and area blood transfusion stations. The appropriate policies concerning these centers and their operating methods are now being prepared.

Our task in the 12th Five-Year-Plan is to double the production of plasma preparations and blood components by making full use of equipment, introducing two- to three-shift operation, and introducing new comprehensive regulations for the production of blood products this year that would increase outputs of preparations to the current world level and that would provide a clear and efficient network flowchart of the process. The hematology service in each union republic should develop a long-range plan to update its existing production.

Further improving the production of blood preparations is inextricably connected with developing and providing the hematology service with new types of equipment and accessories as well as with domestic analog of the best foreign equipment prototypes.

Special mention should be made of the importance of developing and manufacturing equipment complexes for the sterilization filtration of protein solutions, especially domestic sterilizing polymer membranes. This work is being done with institutions from a number of ministries and departments. The appropriate departments and institutions have also been charged with developing and organizing the production of improved equipment that meets the specific requirements for production of blood preparations.

So-called surpluses of plasma and erythrocytes are accumulating in a number of regions while there are no additional capabilities for processing them. It would therefore be advisable to transfer a portion of donor plasma, erythrocyte mass, and intermediate precipitates to institutes for processing into vaccines and sera and to develop a procedure for making joint calculations with these enterprises. Recommendations for introducing a brigade contract into institutions in the hematology service while simultaneously introducing a new system of labor evaluation and differentiated wages for active work must be prepared.

Technical control divisions [OTK] have been created to intensify quality control over operations. The organization of the OTK service had a positive role in increasing the quality of operations and, ultimately, the quality of blood preparations. What is meant here is the constant, daily monitoring that the OTK have been called upon to provide. Unfortunately, the OTK are frequently limited to conducting control research on final products in the end stage of the production process even though production quality and reduction of losses depend on the very beginning stages of production, the quality of the raw material, the quality with which flasks, plugs, and auxiliary accessories and materials are prepared, the quality with which facilities and equipment are treated, and above all, the observance of technological requirements.

The OTK and State Control Commission [Goskontrol] have been charged with a new task that is related to the necessity of strengthening the quality requirements for production being output. The OTK must essentially become organs of the State Acceptance [Gospriyemka] for the blood transfusion stations. One important task of the Goskontrol service is to work to standardize and improve the normative and technical documentation for the production of blood preparations, its components, and hemocorrectors.

Production quality depends mainly on the technology that is used in a production process. Careful development of the technology and compilation of the normative and technical documentation [NTD] created in scientific research institutes is the foundation of high-quality production. Researchers and developers of methods for obtaining preparations should be keenly aware that it is far from always that the technology created at a laboratory table can be used successfully under production conditions. The republic NIIGPK must therefore conduct a detailed preliminary production trial of its new technological developments. Only under such conditions can the distinctive features of mass production, the specifics of large-series production, and the true extent of the equipment and accessories available to blood transfusion stations be taken into account. High-quality scientific-technical documentation can only be produced after a newly developed technology has first been field tested.

Unfortunately, inadequately developed technology and incomplete scientific-technical documentation increase the amounts of time needed to introduce and correct documentation and waste the efforts of practical workers by forcing them to set up the production of a preparation based on a technology that has not been completely worked out. In this context, it is exceptionally important to organize scientific production associations (complexes) within the organizational structure of NIIGPK and blood transfusion stations that would be a unique proving ground for the development, testing, and rapid introduction of new products and that would accelerate the creation of scientific-technical documentation. The TsNIIGPK and leading NIIGPK must prepare appropriate recommendations and policies concerning the creation of scientific-technical associations based on economic operating methods.

The practice of training specialists and certifying workstations is one of the economic levers that make it possible to accelerate the growths of labor productivity, improve the use of fixed assets, improve labor conditions, and increase the social activity and qualifications of workers.

Systematizing and making a comprehensive evaluation of the data accumulated as a result of the implementation of these measures will make it possible to determine the directions to be taken to further improve the use of labor resources and fixed assets and to increase operating efficiency and the volume of production being output.

The presence of labor norms will not only make it possible to discover reserves of labor productivity and thereby intensify the production process but will also become the basis for calculating the costs of blood preparations and components. Work to norm labor in the country's hematology service is currently being conducted in the TsNIIGPK of the USSR Ministry of Health in cooperation with the Center for the Scientific Organization of Labor and Production Management of the USSR Ministry of Health.

A proposal has been made to field-test the results that have been obtained this year in a number of blood transfusion stations and then to use them to develop and introduce corresponding recommendations.

An unsatisfactory situation has evolved with respect to introduction of the plasmapheresis method. It was developed 20 years ago. To date, the plasmapheresis method has been introduced in a large number of the country's blood transfusion stations. Practically all the leading blood transfusion stations (noncategorized, category 1, and category 2) use the plasmapheresis method in their daily practice to increase the volume of those plasma products that are in short supply, to obtain antihemophiliac products, etc. The level at which this modern and promising form of blood donation is used nevertheless remains inadequate. At most blood transfusion stations plasmapheresis is mainly used with active donors, whereas some institutions in the hematology service have begun work to include nonpaid donors in the ranks of donors undergoing plasmapheresis (the Kirov NIIGPK and blood transfusion station, the Yoshkar-Olin republic blood transfusion station, etc). These facts confirm that, with correct organization, these operating principles are a promising way of increasing reserves of freshly prepared plasma. The experience in the use of plasmapheresis that has been accumulated thus far in the scientific and practical institutions of the country's hematology service has confirmed the correctness of the established intervals between plasmapheresis cycles and the volumes of plasma that are extracted, the conditions that have been adopted to ensure the safety of a donor when the formed blood components are returned to him or her, and the clinical-laboratory and medical research that is conducted to ensure the necessary observation of donors' health status in conformity with existing instructive documentation.

Our tasks now are as follows: increase plasma preparation by the plasmapheresis method to no less than 15 percent of the total volume of plasma prepared in the country's hematology service; formulate a yearly plan for preparation of plasma by the plasmapheresis method for all the union republics; and introduce plasmapheresis at all blood transfusion stations (noncategorized, category 1, and category 2) that do not yet use the method in their production activity as well as at category 3 and 4 blood transfusion stations that have the conditions that would ensure the procedure's safe use with donors.

Considering the extent to which treatment institutions are provided with blood and erythrocyte mass and the fact that the principal mass of whole blood is prepared from nonpaid donors whose numbers will increase further, it is no longer necessary to obtain whole blood from active donors. It is more advisable to use this category of donors only for special types of blood donation (plasma, immune plasma, blood cells).

In view of the increase in the relative proportion of nonpaid donors, it is necessary to begin work to include a portion of those individual in the donor pool in the ranks of plasma donors and to use plasmapheresis in nonpaid donors only under hospital conditions. At the same time, expansion of the scales of plasma donation (both by active and nonpaid donors) must not be accomplished at the expense of a simplification of the plasmapheresis process, and the safety of donors' health must be ensured by strict observance of the rules contained in existing instructive documents inasmuch as any violation of the instructions or cases of complications could discredit the plasmapheresis method.

The complex tasks related to the maximum provision of high-quality preparations to treatment institutions can be accomplished more efficiently and more completely by realizing the entire set of measures geared toward further development of plasmapheresis in the country,

including organizing special plasmapheresis departments, improving material and technical provision and planning, and making efficient use of all existing forms of blood donation and methods of obtaining blood components and preparations.

The activity of the blood transfusion divisions [OPK] are very important in improving the hematology service's operation. More than 2,000 OPK have been established to date. They prepare more than 30 percent of all blood annually. On the one hand, the operation of the OPK has satisfied treatment institutions' needs for blood for transfusion; on the other hand, however, many OPK have begun preparing significantly larger quantities of blood than are needed by the treatment institution in which they are functioning. Larger volumes of blood are being sent to blood transfusion stations that do not always use it efficiently, which intensifies the problem of the utilization of erythrocytes. In this context, it is necessary to concentrate the operation of an OPK on preparing blood and its components only in those quantities that are necessary to meet the needs of the treatment institution in which it is functioning and to activate and direct the activity of OPK toward popularizing modern tactics for conducting transfusion therapy.

Clinical observations as well as statistical and scientific analysis of the causes of posttransfusion complications confirm that the most frequent cause of such complications is the transfusion of blood that is incompatible from the standpoint of the ABO system and Rh factor. Also alarming is the fact that the relative proportion of complications caused by the incompatibility of transfused blood due to rare groups of antigens has increased in recent years. Complications after transfusion of blood substitutes are encountered rarely; however, their lethality is high. All of this has dictated the need to improve work geared toward preventing posttransfusion complications.

Further development of the problem of blood donation is very important. In recent decades, the development of blood donation in the country per 1,000 population has reached the level of most of the world's developed nations. Virtually all social groups across all age groups of the population are participating in the blood donation movement.

In addition, analysis of the status of blood donation in the country reveals that further development of this trend will only be effective if new scientific and organizational principles for the further development of blood donation in the country are developed and introduced. These new principles must make an allowance for modern needs, including obtaining even levels of blood donation throughout the country and increasing the quantity of blood donated by nonpaid donors.

Joint efforts with local Red Cross and Red Crescent organizations must be undertaken to increase the involvement of individuals from the nonproduction sphere in blood donation.

Cohorts of individuals who have been immunized to prevent infectious diseases must be relied upon more extensively for blood donations in view of the hematology service's increasing need for immune plasma to produce immunoglobulins with a directed effect (antistaphylococcal, antitetanus, antipyocyanic, etc.) and the limited extent to which wide-scale immunization of the public has been conducted at blood transfusion stations and OPK. The hematology service has had experience in this type of work. In the Belorussian NIIGPK, for example, effective organizational principles have been proposed and introduced for working with nonpaid immune donors. A travelling brigade from the blood transfusion station is immunizing nonpaid donors. Immunizations are being conducted at enterprise dispensaries during hours that are coordinated with shift changes. In that way donors do not use more than 15 minutes of their nonworking time. After donors who have consented to the plasmapheresis procedure have completed their course of immunization and after the appropriate examination, they are transferred to the category of immune plasma donors.

Contact between blood transfusion stations and the sanitary and epidemiologic service is very important in organizing immune blood donation. The compilation of special groups of immune donors will become a reality in places where the mean indicator of public participation in nonpaid blood donation is at a high level. This in turn will result in the development of a fundamentally new form of nonpaid blood donation. This refers primarily to the work of institutions in the hematology service, Red Cross, and Red Crescent in the Central Asian and Transcaucasian republics. The hematology service has recently proposed and is introducing organizational principles for working with nonpaid plasma donors and immune blood donors.

One important direction in the hematology service's activities to develop blood donation is the development of new methods of medical support for blood donation and protection of donors' health. The introduction of computerized information retrieval systems to keep track of different donor cohorts, which will significantly simplify the system of assembling groups of donors with rare blood types and groups of bone marrow donors, will increase the reliability of testing blood for HB-antigen and detecting the AIDS virus.

A new branch of production transfusionology—a specialized service for the immune typing of blood cells—will be formed during the 12th Five-Year-Plan. The organization and activity of this service will make it possible to gather large cohorts of blood and bone marrow donors who have been typed according to histocompatibility antigens and to create a register of typed donors. This will result in a significant increase in the therapeutic effect of transfusing blood and its components and transplanting bone marrow.

The quality of transfusion assistance that is provided in the country will depend on how fast we can restructure our work in the principal directions of the hematology service's production activities.

12794

Measures To Improve Drug Supplies

18400218 Moscow IZVESTIYA in Russian 28 Jan 88 p 2

[Article by V. Korneyev and S. Tutorskaya: "Medicines Which Are Being Awaited"; first paragraph is IZVESTIYA introduction; last four paragraphs are IZVESTIYA interview with V. Kalinin, chief of USSR Ministry of Health Main Administration of Treatment-Preventive Aid]

[Text] How the pharmacy network of the country is supplied with medicines was the topic of conversation at a joint board meeting of the USSR Ministry of Health and USSR Ministry of Medical and Microbiological Industry.

"The demand for medicines," reported USSR Ministry of Health Main Administration of Pharmacy Management Chief A. Apazov, "was met by 78-80 percent last year. This includes the demand for cardiovascular drugs which was met by 60 percent."

The point is, last year import purchases from various countries were sharply curtailed. This immediately complicated the situation with a number of medicines, including drugs for treatment of cardiovascular diseases. Understandably, the number of complaints and reprimands increased immediately. There was less lamentation about the shortage of domestically produced medicines than in the past. And nevertheless the domestic industry is still not at a high level. One of the plants disrupted delivery of infusion salt solutions in small doses and rheopolyglucin (a blood substitute). The Tashkent Chemical Pharmaceutical Plant failed to deliver 30 medicines. A poor job was done by the Lekrasprom Association, whose task was to provide pharmacists with medicinal herbs. The style of work in this association is surprisingly "stable": they postpone fulfilling demands to later and later dates, and then they refuse to do them at all. An extremely small amount of x-ray contrast media is being produced by the medical industry, which makes the diagnostic process impossible in many treatment establishments.

Even ordinary surgical gloves, nipples and other necessary articles made from rubber are being produced only in small quantities and poor quality. The Ministry of Chemical Industry messes up this situation from year to year. The State Agroindustrial Committee fails to deliver mustard for mustard poultices, lidase [purified testicular enzyme preparation containing hyaluronidase] for enzyme preparations, or glucose in the necessary amounts. And the reason here lies not so much in objective difficulties as in a many years' reluctance to spend time on such "minor" problems. Which both of the aforementioned departments brilliantly confirmed at the board meeting—the Ministry of Chemical Industry sent an ordinary associate who had no authorization to take a position with regard to assessing the overall situation in the ministry, while the State Agroindustrial Committee was not represented by anyone at all.

In a brief notice it is impossible to tell about everything which was said at the board meeting. It is important to note that this year all possible measures are being taken so that there will no shortcomings in cardiovascular drugs. And something else: for the first time in recent years, the rate of growth of capacities of the medical and microbiological industry has been outrunning the growth of the population's demand for medicines. New pharmaceutical chemistry plants will be put into operation.

USSR Minister of Health Ye. Chazov called for primary attention to be focused on the manufacture and purchasing of those drugs which will save lives. We should, the minister said, put together a time frame for fitting out pharmacies where providing these drugs will be given the highest priority.

A far from easy situation has developed with regard to insulin, said the participants in the conference. Large batches of insulin were rejected as defective at the end of last year. The defective product appeared as a result of imperfect technology and shortcomings in packaging. Our producers are now taking timely measures to improve the quality of insulin. We are expecting the arrival of representatives of leading foreign firms who are prepared to help us in this.

As before, the question of manufacturing special medicinal forms for children remains urgent. In particular, reminded V. Alekseyev, chief of the Main Administration of Treatment and Preventive Aid to Mothers and Children, in order to successfully treat small children, drugs—glucose, injection solutions—are required in small packaging forms. This is a question of sterility, and possibly of life and health, and not merely one of economizing on medicine.

The raw materials base, noted USSR Minister of Medical and Microbiological Industry V. Bykov, should not hold back the producers. Can it really be considered normal that the medicine manufacturing industry expends up to 11 percent of its capacity on providing itself with medicinal raw materials and preparing them? The minister also spoke of the impermissibly long "road testing" time of new Soviet-produced medicines, of checking them before the stage where they are manufactured in industry.

And here we heard two more pieces of information. First, the USSR Ministry of Health will soon put into operation a new system for testing medicinal substances. And the second innovation was no less important. A physician will be permitted to prescribe for the patient any domestic or import drugs. Still another institution will be abolished, the one according to which a physician who is not working in an outpatient clinic or polyclinic cannot issue a prescription for medicine. Of course, the new order will require from both producers and pharmacy workers a new organization and mobility, and improved information and publicity. It turns out that one-tenth of all refusals of medicine are caused not by the absence of the medicines, but by organizational shortages in the work of the pharmacy service.

Finally, the "Medicine Aid" Automated Control System is being put into operation—this will help to better disseminate the items which are in supply. The Ministry of Medical and Microbiological Industry is also "turning its face toward" the pharmacies. It is planned to increase the manufacture of devices for mechanizing the labor of pharmacy workers.

Yesterday our newspaper published an article titled "What Will Become of 'Katrex'?" As has become well known, a group of patients suffering from tumor diseases was received by USSR Minister of Health O. Shchepin and USSR Ministry of Health Main Administration of Treatment and Preventive Aid Chief V. Kalinin. The patients were concerned about how they would now be able to obtain the drug "katrex." We asked V. Kalinin to tell us what was said at the meeting and what decision was arrived at.

[Answer] At this time the Pharmacy Committee has not made a final decision, we are continuing treatment with "katrex," which is being done in a number of hospitals according to agreements earlier concluded with the A. Gachechiladze Laboratory. These establishments will continue to receive "katrex," as well as those who are treating patients on an individual basis. The difficulty of using the drug lies in the fact that it is only usable for a brief time. As of now there is no prolonged form.

[Question] The IZVESTIYA article talked about an "alternative" opinion with regard to "katrex" expressed by scientists and physicians from a number of clinics.

[Answer] The materials from these establishments and all data presented to the ministry will be thoroughly studied before one decision or another is made concerning the drug.

12255

Problems with Pay Polyclinics

18400258 Moscow MOSCOW NEWS in English No 9, 1988 p 4

[Article by Natalya Paroyatnikova and Viktor Tursha-tov: "Health in Roubles and Kopeks"]

[Text] **Paying for medicine in the capital**

As we are all well aware, health is dearer than money, and the leading specialists have only recently undertaken to find out how much dearer. It turns out that we'll have to increase spending on free medical care in the USSR by at least 200 per cent. On the other hand, we have additional medical establishments operating on a cost-accounting basis, usually [sic] referred to as "paying polyclinics."

Their part in the overall volume of services offered by our medical system is small—about one per cent. But, in 1987 alone, this one per cent, doing its own thing, collected 360 million roubles from patients. The annual income of the Moscow City Administration (Russ. abb. UHLU) of Cost-Accounting Medical Establishments alone is comparable with that of a well-organized major production unit. Still, all this tells us little, taken by itself. More often than not the fence of "well-to-do" figures hides problems and contradictions that call for serious attention.

A FLOURISHING CHEMIST

The No. 3 paying polyclinic is probably the best known in Moscow. It is definitely the oldest. Medical Leech Chemist opened on the ground floor of a respectable house in Arbat in the 20s. For a moderate sum those in need were given immediate medical attention. Time marched on, types of medical aid and treatment methods changed and floor after floor went to the medics. Only the concept "money then treatment" remained the same here. And now, in February 1988, at the reception desk several similar announcements leap to the eye—"Make appointments with specialists a week in advance." Next to these hangs the price list—a consultation with a D.Sc. (Medicine) (irrespective of specialty) costs eight roubles; with a Candidate of Science—six roubles 50 kopeks, a visit to an experience doctor without a scientific degree—four roubles. The prices are not astronomical, but then nor are the visitors millionaires.

Reference: Some 85 per cent of visitors to the paying polyclinics are people with average or low incomes.

So, what draws hundreds of Muscovites and visitors to Moscow to these polyclinics every day? Are theirs the only highly specialized doctors who can "do wonders"? The statistics show, without prejudice, that quite often (sometimes in 35 out of 100 cases) the doctors in paying polyclinics "only" slightly alter or correct the initial diagnosis, and advise the patient on how to get rid of his or her illness. Therefore, people often apply to the one paying per cent of the medical service simply through a desire to pay for a consultation.

You can tell what problems the polyclinic is facing from some of the notices put up there. One informs visitors that the administration cannot provide beds for clients who live outside Moscow (up to 30 per cent) for the period of their treatment. Another says apologetically

that ultrasound diagnostics are done only on appointment by the polyclinic's own doctors (there is not enough time to receive patients of other doctors). Another notice informs that a certain Doctor of Science soon is fully booked up for the current month. In short, the polyclinic cannot satisfy everybody.

"We grew out of our building a long time ago," says Koba Mertskhulava, chief physician there. "Excellent specialists would willingly work with us and there are crowds of patients. But we don't have enough rooms. We're asking for the auxiliary premises of a neighbouring pet shop, but have been told that these can't be put at our disposal. Who benefits from the crates and bags of bird feed standing there?"

Soon we switched over to economic matters, and I discovered that the chief physician has no right to offer incentive to the best workers here. Even though the polyclinic nets over 150,000 roubles in profit a year, the bonuses cannot exceed 20 per cent of a doctor's salary.

MEDICAL TRUST

The chief physicians of paying polyclinics are, of course, specialists. Such words as "depreciation," "deductions" and "profit" do not confuse them, as is often the case with the majority of their "budget" colleagues. But at the beginning we still tried to talk about something else.

"Is it moral to earn money on people's misfortunes or, to be more precise, on their illnesses?"

It was suggested, in reply, that we take a closer look at the money earned on "people's misfortunes," or rather, at how it is being spent. The greater part goes for the wages of physicians, paramedics and cleaning staff. Another item of expenditure is the modern medical equipment. Then there are repairs to the building, transport maintenance costs and so on. In short, all the money is spent on maintaining the high quality of medical services. So, it is wrong to think of it in terms of "easy money" and the formula "treatment then money" is quite justified in the customer's eyes.

Reference: Only three out of 20 cost-accounting polyclinics have special premises, another three are in separate buildings. The premises of the other polyclinics do not meet the usual sanitary and aesthetic norms and are in need of an overhaul.

All the money earned by the polyclinics is put into one "common fund." Maybe, it is worthwhile granting them financial independence? It looks reasonable and in keeping with the spirit of the times. But if we take into account that overhaul alone of the buildings would now amount to some six-figure number, then the idea loses its initial attraction. The Moscow UHLU is a sort of a small trust with seven staff management units. True, instead of a board of directors it is managed by one person—Valentina Boldina, chief of the Administration.

Ten months ago she inherited from the previous chief financial reports revealing that nearly half of the polyclinics were in the red. The situation cannot be rectified without applying cost-accounting methods and, as Boldina says herself, the latter has become her religion. She urges the chief physicians to adopt these methods and demand that they study economics. There have already been some good results. Only two polyclinics were in the red in the annual report.

One of them—the homeopathic polyclinic—suddenly went bankrupt, after starting off as a thriving enterprise at the end of last year.

COST ACCOUNTING ON CREDIT?

As it turned out, the polyclinic as such had nothing to do with the losses at all. Is is still earning quite a sizeable income. But last October the first and, as yet, the only paying hospital in the country, with 120 beds (also homeopathic) was opened a stone's throw away from the polyclinic in Entuziastov Highway. The two united into a single organization,. In two and a half months, the hospital ate up what the polyclinic had made in a year and amassed huge debts.

Whoever took the decision apparently failed to take everything into account. Homeopathic treatment is long (sometimes lasting several years). The doses of medicine are very small and cheap (about 35 kopeks a day). The hospital, unfortunately, does not issue sick-leave certificates, so only a few patients can resort to this method of treatment. In conditions of cost accounting, these factors threatened to torpedo the experiment.

At first there were disastrously few patients, two-thirds of the beds were empty (with a complete staff of doctors, paramedics and others earning wages). Advertisements on the radio and in the press failed to change much. Then it was decided to lift the ban on treatment of people living outside Moscow. (At first the hospital was strictly for Muscovites.) The situation impoved [sic], but not enough to pull it out of the crisis. The retreat from the laws of supply and demand threatened disaster.

The city health department insisted that the hospital started using traditional methods of treatment, to guarantee a full house. But the administration decided to act differently and to retain its specialization.

Reference: People applying to paying polyclinics most often need to consult a gynaecologists—19.3 per cent; therapeutists—19.2 per cent; neuropathologists—12.8 per cent and then urologists, surgeons, dermatologists, etc. The share of the "etc." (including the homeopathists) is 8.3 per cent of the visits.

The first impressions of patients on entering the spacious hospital building with its large wards—two-three beds in each—is one of wonder! It defies all comparison with the dark wards of ordinary hospitals. However, a closer look

blurs the rosy picture. On the wall near the lift someone wrote next to a heap of bed linen—"High time someone removed this!" Apparently it had been lying there for several days. The day we visited the hospital, the dinner was several hours late, and the patients didn't even complain—they were so used to it.

In short, we got the impression that the people at the hospital regarded cost accounting only as a set of guarantees and rights, without any obligations whatsoever. That's a pity, because the hospital was regarded as an experimental model which would show all the pluses and minuses of paying hospitals.

OLD RESTRICTIONS

We think that cost accounting alone can help those medical establishments operating on a cost-accounting basis to deal with their problems.

But, in fact, the official name given to paying polyclinics several decades ago camouflaged the "money then treatment" formula rather than reflect the essence of the economic relations between the medical establishment and the person in need of its services. Judge for yourself—the profit made by the polyclinic used to be taken away only two years ago. In order to purchase even the simplest medical equipment they had to beg their superiors. No one even thought about independence, not even in a purely theoretical context. And today?

Despite all the economic innovations of the last two years, UHLU only has got the right to dispose of its own money, and even this is limited to the purchase of medical equipment. As we have already said, there is a strict limit on doctors' wages which do not depend either on their contribution or on the income of the medical institution. Generally speaking, the development of this one per cent of our medicine is still in the tough shell of old instruction.

It is planned to increase paying medical services five times by the year 2000. If we are slow to introduce them, then they'll remain a rarity. Maybe it would be better to bring paying medical institutions under the Law on State Enterprise, to allow them to develop independently, according to the population's needs, so that the "money-treatment-money" concept can be applied properly.

[Photo caption: At the paying hospital: spacious wards; physical therapy treatment. Photos by Alexei Fyodorov]

13227

Issues in Family Physician Health Care

18400252 Moscow MOSKOVSKAYA PRAVDA in Russian 6 Jan 88 p 3

[Interview with Lyudmila V. Lyubimova, chief, Health Department, Lenin Rayon, conducted by V. Sotskov]

[Abstract] Beginning with January 1, 1988 residents of the Lenin Rayon have the option of selecting their own family physician. Patients' choices are known to be determined by the rapport that a physician is capable of establishing with his or her patients, as well as by clinical competence and reputation. The dearth of family physicians becomes acutely felt in such situations because of the greater responsibility placed on the physician and the demand for a multifaceted approach to health care. All too often many district physicians have developed the habit of simply referring just about every case to a specialist, letting their own clinical skills deteriorate in the process. The problem is further compounded by the fact that appropriate postgraduate medical literature at the family physician level is lacking and, in fact, very few medical institutes provide training in family medicine as a specialty in its own right. Factors that further discourage many district physicians from assuming the full responsibilities of general practice in health care delivery include the need for home visits, lack of portable instrumentation (with the exception now of a portable EKG machine telelinked to a cardiology unit), and inadequate financial renumeration. While it is recognized that not every physician has the personality for engaging in this type of medical care and while personal interrelationships are of prime importance in family medicine, the problem is much more complex than that and requires a fresh evaluation of the psychological, social, economic, and educational foundations underlying successful family care.

12172/9738

Special Medical Team Sent to Chita Oblast

18400253 Moscow SOVETSKAYA ROSSIYA in Russian 20 Feb 88 p 2

[Article by A. Nemov: "Landing Force of Charity"]

[Abstract] Plans have been made to send a medical detachment of some sixty specialists from cities such as Moscow, Leningrad, and Sverdlovsk to Chita, where the infant mortality rate is alarmingly high (more than 22 newborns per 1000 never reach one year of age in the Chita Oblast, an industrial region with a population of nearly one and a half million). Seven especially problematic locations have been identified in the oblast. The specialists expect to spend a month in Chita restructuring the operation of maternity homes and children's polyclinics, hospitals, and dispensaries. Their aim is to find the weak spots in Chita's health care system and in its material and technical supply; determine the cause of the high turnover rate among physicians, especially in rural areas; and make a precise diagnosis of the reason for the extremely poor training specialists receive at the Chita Medical Institute. If necessary, children who require more careful examination or treatment will be sent to Moscow.

13227

Reasons For High Infant Mortality In Chita Oblast

18400259 Moscow SOVETSKAYA ROSSIYA in Russian 2 Mar 88 p 2

[Article by A. Gamov, special correspondent: "What Ails Pediatrics?"]

[Abstract] The special medical team sent to investigate the high infant mortality rate in the Chita Oblast saw more than a thousand children in its first week in the oblast and reached some preliminary conclusions. Fourteen infants born at the okrug hospital died last year, half of them at birth. Poor, crowded working accommodations in the hospital are believed to have contributed to this statistic. Investigators, for example, found the wards in the hospital to be poorly heated. The isolation ward was closed, because it was too cold. Another reason for the high mortality is thought to be the shortage of gynecologists: there are only three in the entire Aginsk Rayon, including those on staff in the maternity unit of the okrug hospital. Getting into the prenatal dispensary requires special paperwork, which is difficult to obtain in the okrug center. Women who live 100 km or more away usually don't see a doctor. Expectant mothers go for months without an examination, which leads to a myriad of problems. The situation is said to be the same in the Mogoytuysk and Duldurginsk rayons of the okrug.The head physician of the Fourth Children's Association of Orenburg, Z. Musayev, said the biggest problems are poor care for pregnant women and tardy hospitalization when they come to term. M. Belov, candidate of medical sciences and an assistant in the department of children's infections of the Orenburg State Medical Institute attributed the problems to poorly trained mid-level and junior medical personnel. N. Ilina—candidate of medical sciences, an assistant on the department of children's diseases of the Chita State Medical Institute, and a member of the special medical team—called the problem a result of the "regional illness of our pediatrics": better obstetrics-and-pediatrics complexes must be set up.

13227

Revision of Medical Examination System

18400260 Kiev PRAVDA UKRAINY in Russian 31 Jan 88 p 2

[Article by Ye. Goncharuk, Rector of Kiev Medical Institute imeni A. A. Bogomolets, Corresponding Member of the USSR Academy of Sciences]

[Abstract] The Kiev Medical Institute, along with three other of the country's largest higher educational institutes of medicine, is part of an experiment involving a radical transformation of the learning process. The experiment entails a new curriculum whose purpose is to foster the achievement of the two key aims of medical education—namely, the acquisition of the knowledge that meets the requirements of today's level of science and the mastering of the state-of-the-art practical skills needed by the physician. One of the innovations of the new curriculum involves increasing the number of hours a student must devote to medical and biological disciplines and reintroducing the physicians' examination given at the midpoint in the student's academic career. The midpoint examinations were abolished in the sixties, but now they are being restored with an uncompromising significance. Before the examination, the students must demonstrate their practical skills. Those who do poorly are dismissed or, if they are willing, can be sent back to the second year of medical preparatory school. The restructuring affects everyone, regardless of citizenship.The midpoint examinations and the certification for practical bedside skills that precedes them represent the first stage of the new curriculum. The second stage consists of state examinations on medical disciplines during the sixth year. Again, practical skills—by now those expected of a physician—are checked beforehand. Students who have not mastered such skills will not be allowed to take the examinations. The third stage of the state certification will follow the seventh year of training, when interns, based at treatment facilities, are preparing for the specialties called for by the health care agencies. Up to 20% of the students will will be allowed to do their internship under the direct supervision of the institute.

13227

Electrical Activity of Human Brain Under Conditions of Extreme Conditions of Activity

18400147a Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 8, No 5, Sep-Oct 87 pp 112-120

[Article by A.B. Kogan and P.N. Yermakov, Rostov State University, Rostov-on-Don]

[Abstract] It has been noted previously that prolonged psychomotor training makes it possible to form a qualitatively new status—that of psychomotor activity characterized by its own bioelectrical activity in the workings of brain mechanisms with a predominance in the lobar division of low frequency fluctuations. Characteristic fluctuations similar to paroxysmal psychomotor waves appeared in highly trained athletes in response to rhythmic light stimulation under conditions of high stress. In the present work a study was made of the electroencephalographic indices of the functional states of athletes under limiting or near limiting conditions of task fulfillment. The training period for the functional state of the brain was characterized by the presence of slow wave activity with right hemisphere asymmetry and a high level in interhemisphere coherence, which could be related to the increased tone in the limbic structures. After successfully completely the assignment, the asymmetry changes sign and the interhemisphere coherence intensifies. It is hypothesized that optimal adaptation to extreme conditions is brought about by various psychophysiological mechanisms of regulation of interactions between activating and inhibiting influences of reticular formation and limbic structure. Figures 3; tables 2; references 29: 21 Russian, 8 Western.

12765

Modeling of Decision Making in Two Person Game with Non-Opposing Interests

18400147b Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 8, No 5, Sep-Oct 87 pp 142-146

[Article by T.N. Savchenko, Institute of Psychology, USSR Academy of Sciences, Moscow]

[Abstract] Decision making is one of the basic elements in the structure of psychic regulation of activity, and mathematical modeling occupies a significant place among the many methods of studying it. The classical theory of games in particular has been developed to describe decision making in conflicting situations. The games theory can formally describe the decision making process for a very large class of real situations; however, the principles for selecting decisions as developed by game theory are seldom used in decision making in real situations. Nevertheless, the game theory has a great effect on the development of psychological theories on decision making in situation of conflicting interests, and the results of such developments could be applied to selecting a correct strategy in decision making in conflicting situations. In the present work some possible psychological principles for decision making in two person games are formalized. Required and satisfactory conditions for existence of solutions to the game and corresponding strategies were found for several criteria of decisions used by the players. This work took first place in a contest among young scientists. Figures 2; references 6: 4 Russian, 2 Western.

12765

USSR Prize for Radiation Pathogenesis Research

18400224 Moscow ADVANCES OF SCIENCE AND TECHNOLOGY in English No 33, 25 Nov 87 pp 1-3

[Text] For the development of a theoretical foundation of the radiation-provoked death of lymphoid cells and its use in exploring the pathogenesis of radiation sickness, a group of scientists have been awarded a USSR State Prize for 1987. At APN's request, one of the participants in that study, the well-known Soviet radiobiologist Alexandr KUZIN, speaks about this interesting work.

More than 40 years ago the phantom of nuclear war, threatening mankind not only with large-scale devastation and heavy loss of life but also with the discharge of radioactive substances in quantities causing mass radiation sickness, loomed over the world with sickening reality. It was still at that time when very little was known about the nature of radiation sickness that our team started extensive studies into the mechanism of that sickness on the organism, at cellular and molecular levels. The results spelled out in 15 major research papers and more than 150 scientific articles made up the sequence of studies which was awarded a State Prize for 1987.

In those studies we have for the first time laid down the general principles of post-radiation cellular devastation of lymphoid tissues—the characteristic and rapid consequence of massive exposure of animals and humans to lethal and sublethal doses. We have ascertained the role in that process of the massive destruction of lymphoid cells before their arrival at the division phase, known as interphasal cell destruction. For the first time we have shown the importance of the interphasal destruction of thymocytes (lymphoid cells of the thymus which is located above the heart, behind the sternum) in the pathogenesis of radiation-provoked destruction of bone marrow: the marrow syndrome of radiation sickness. We have discovered that cooperation between the so-called T-lymphocytes of the thymus and the stem cells of the marrow is essential for normal blood formation and that its disruption as a result of radiation is closely associated with the interphasal destruction of thymocytes. This brought up the need of studying the molecular mechanisms of radiation-provoked interphasal destruction of lymphoid cells, which was done in due course.

In doing so, we found out that DNA lesions immediately occurring as a result of radiation are quickly repaired and do not serve as a direct cause of interphasal destruction, which occurs 2 to 6 hours after the exposure. We detected post-radiation characteristic changes in the properties and functions of biological membranes, shifts in the cells' energy balance, changes in the ion balance and early deviations in the RNA metabolism in the exposed nuclei of lymphoid cells. On the whole, that served as a kind of signal for the synthesis of specific enzymes which are responsible for the second stage of the disintegration of chromatin which immediately causes interphasal cell destruction.

We have established the hitherto unknown nature and properties of that enzyme and found ways of inhibiting its synthesis, thereby preventing the destruction of cells. Products of the disintegration of chromatin after the death of lymphoid cells rapidly appear in the blood and urine of the exposed organisms, reflecting the dosal and temporal regularities of the radiation-provoked destruction of cells in lymphoid tissues.

On that basis we developed special analytical methods which help diagnose the severity of radiation sickness at its early stages, which have since been introduced into medical practice.

It must be especially noted here that the rich arsenal of methods which is at the disposal of modern radiation medicine and hygiene and which is effectively used in radiation emergencies is based on fundamental radiobiological studies, including those presented in the series which has been awarded a State Prize.

In those studies a prominent place is held by theoretical concepts and generalizations. The structural-metabolic theory which was developed in radiobiology on the basis of those studies has for the first time pointed to the need of studying structural and metabolic changes in their unity and interdependence for understanding the involved mechanisms of radiation's impact on the organism. That theory has for the first time enabled us to comprehend from coordinated positions the molecular mechanisms of the effect of heavy doses of ionizing radiation on the organism, as well as that of very small doses, which can be extremely beneficial for a number of bodily functions.

We have experimentally proved a generalizing hypothesis about the presence of a genetic program of interphasal destruction of lymphoid cells - a program that starts working under the impact of not only radiation but also of a number of alkylating agents and of that natural regulator of vital processes, hydrocortisone. Thereby, we have exposed the fundamental laws of hormonal destruction of lymphoid cells under natural conditions. The concept of the existence of a genetic program of cell destruction successfully used in tackling radiobiological tasks will doubtlessly prove useful in the analysis of various pathological conditions based on the rejection and destruction of cells.

07310

Detection of Antibodies to the AIDS Virus and Virus Antigen by the Elisa Test Using Horseradish Peroxidase and Beta-Lactamase

18400150a Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 87 (manuscript received 30 Jun 86) pp 551-554

[Article by Yu. Yu. Vengerov, M. I. Parfanovich, N. G. Yaroslavtseva, S. M. Vorobyev, T. Ye. Semenov, A. A. Kushch, V. Ya. Nisanov, A. P. Smirnova, N. A. Fedorova and Ye. S. Severin, Enzyme Chemistry Problems Laboratory, Department of Biochemistry, Moscow State University imeni M. V. Lomonosov; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] This article describes a test system for detection of AIDS virus antibodies based on the use of a domestic strain of the virus, using horseradish peroxidase and β-lactamase as marker enzymes. The ELISA method of detecting AIDS virus antigen, used to monitor accumulation of the virus during cultivation and purity of the antigen as it is isolated, is also described. The AIDS virus used in the study was obtained from an African-born female AIDS patient undergoing treatment in the USSR at the Institute of Virology. The test system described for detection of the AIDS virus antibodies is suitable for mass screening of donor blood specimens. The area of application of the antigen test cannot be as broad, since it requires the use of human positive serum, the sources of which are quite limited. These tests can also be useful, however, as control procedures in the production of viral antigen for test systems for the detection of AIDS virus antibodies. Figures 2, references 4: Western.

06508

Study of the Effect of Domestic Chemical Preparations, Reaferon and Inducers on HIV Retrovirus Reproduction

18400150b Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 87 (manuscript received 30 Dec 86) pp 561-565

[Article by I. F. Barinskiy, S. V. Gribencha, S. L. Nesterchuk, and V. M. Zhdanov, deceased, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] The production of transplantable human T-lymphocytes chronically infected with HIV has made possible in vitro screening of chemical substances which suppress the reproduction of the virus. Such methods have already been used to find substances which effectively suppress in vitro HTLV-III [HIV] reproduction: suramine, ammonium 21-tungsto-9-antimoniate (HPA-23), ribavirin, phosphonoformate, 3'-azido-3'-deoxythymidine, synthetic D-penicillamine, the new compound AL-721 and others. Most of these compounds are reverse transcriptase inhibitors for the retrovirus. Recent studies have reported effectiveness of human α-interferon as well. This article studies the effect of the Soviet preparations ribamidil, sodium phosphonoformate and acycloguanosine, as well as reaferon (genetically engineered α-interferon) and the interferon inducers lafarine, ridstine, rifastine and enkad on HIV reproduction in cell cultures. Only ribamidil (50 μg/ml), sodium phosphonoformate (680 μM, 120 μg/ml) and recombinant human α-interferon (1000 IU/ml) can reliably suppress HIV reproduction in the T-lymphocyte lines studied. The ineffectiveness of the interferon inducers may be related to their inability to induce large quantities of interferon in vitro in the system used. Donor peripheral blood lymphocytes must be used to answer this question. References 20: 2 Russian, 18 Western.

06508

Interferon-Inducing and Antiinfluenza Properties of 3-(2,2,2- Trimethylhydrazinium) Propionate

18400150c Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 87 (manuscript received 20 Jun 86) pp 576-579

[Article by I. B. Kremerman, L. S. Priymyagi, I. Ya. Kalvinsh and E. Ya. Lukevits, Scientific Research Institute of Epidemiology, Microbiology and Hygiene, Estonian SSR Ministry of Public Health, Tallinn; Institute of Organic Synthesis, Latvian Academy of Sciences, Riga]

[Abstract] Results are presented from a study of the production of interferon and the antiinfluenza activity of 3-(2,2,2-trimethylhydrazinium) propionate (THP) in mice. The preparation was administered as an aqueous solution, 0.2 ml in various doses i/p, i/m, and orally. The level of interferon was determined in the blood serum after 4, 24, 48 and 72 hours. The protective effect was determined using 20 mice for each dose tested. Doses varied from 0.05 to 300 mg/kg i/p and 0.05 to 200 mg/kg by the other two administration paths. The substance was found to induce interferon by all administration paths in doses of 50, 100 and 200 mg/kg, the quantity and peak of formation of interferon depending on the dose and method of administration. Repeated daily administration of 100 mg/kg over 2, 3 and 4 days did not induce endogenous interferon formation but did facilitate the development of refractory reactions. To study the antiinfluenza activity of THP it was administered at 50-1000 mg/kg i/p and orally once and repeatedly, either before or after exposure to the influenza A (H3N2) virus. The prophylactic effect was 30% for double oral administration of 100 mg/kg before exposure to the virus. Intraperitoneal administration of 100 mg/kg 48 hours before infection achieved 75% protection on the sixth day of observation, 70% on the 14th day. A dose of 100 mg/kg administered i/p 24 and 48 hours after infection had a therapeutic effect of 45 and 35% on the 6th and 14th days when administered 24 hours after infection,

30% and 20% on the 6th and 14th days when administered 48 hours after infection. A protective effect of 30% was achieved by a dose of 100 or 200 mg/kg i/p two weeks before infection. References 5: Russian.

06508

Identification of mRNA of Nucleocapsid Proteins of Pathogenic Arenaviruses

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[Abstract] Results are presented from in vitro translation of RNA from cells infected with the Machupo and Lassa viruses, and the RNA with template activity with respect to nucleocapsid (NP) protein of both viruses is identified. Two noncellular protein-synthesizing systems were used to translate RNA isolated from the cells infected with Machupo and Lassa viruses. The system from wheat seeds translated RNA from cells infected with vesicular stomatitis virus, but was ineffective for translation of arenavirus mRNA. A cell-free protein-synthesizing system from rabbit reticulocytes was used for mRNA translation. In the next stage, the products of translation of total virus-specific RNA were treated with specific antibodies, and the immunoprecipitates were analyzed by electrophoresis in polyacrylamide gel. The total RNA from cells infected with Machupo virus coded synthesis of a polypeptide migrating to the gel in the area of the structural NP protein of the Machupo virus. The RNA studied thus contains a virus-specific mRNA of the NP protein. In a final series of experiments the total RNA from the infected cells was fractionated by sedimentation in a linear sucrose concentration gradient. The results indicate that the Machupo and Lassa virus NP protein mRNA has a sedimentation coefficient of 15-16 S. Figures 5, references 19: 5 Russian, 14 Western.

06508

Use of Monoclonal Antibodies to Differentiate Strains of the Virus of Hemorrhagic Fever with Renal Syndrome

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[Abstract] A comparative study is presented of strains of the hemorrhagic fever with renal syndrome (HFRS) virus from different origins using monoclonal antibodies to determine the degree of their antigen affinity. The use of fluorescent methods utilizing sera from HFRS patients and animal hyperimmune sera had previously revealed common antigen determinants in all HFRS virus isolates from various regions of the world. Further studies of isolates in the neutralization reaction allowed clear differentiation of serotypes: Apoedemus, Clethrionomys, Rattus and Microtus, named for the rodents from which they were first isolated, although correlation is not absolute. The use of monoclonal antibodies has now confirmed the existence of four serotypes and the presence of antigen interconnections among strains isolated in the USSR from Clethrionomys glareolus. Clear serodifferentiation with Apoedemus and Rattus was observed, with a cross relationship between strains isolated in the USSR and the PHV (Prospect Hill virus) strain from the USA. References 15: 3 Russian, 12 Western.

06508

All-Union Conference on Neurosciences Devoted to 100th Anniversary of Birthday of Academician D.S. Vorontsov

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[Article by P.M. Balaban]

[Abstract] The first conference on neurosciences in the Soviet Union was held in December 1986 at the Institute of Physiology, UkSSR Academy of Sciences in observance of the 100th anniversary of D.S. Vorontsov, a founder of the scientific school of neurophysiologists in the Ukraine. The word "neuroscience" reflects the tendency towards close overlapping in the fields of biochemistry, biophysics, and electrophysiology for the purpose of studying the functioning mechanisms of the nervous system. The conference was attended by 120 scientists representing almost all physiological centers of the country. The organizers of the conference (Institute of Physiology, UkSSR Academy of Sciences, Department of Physiology) formulated three basic questions for discussion: (1) molecular mechanisms of stimulation (2) the nature of synaptic transfer, and (3) cellular foundations of learning. The first two days of the conference was noteworthy in the high modern level of the reports and discussions, which were dominated by the "kanalchiki", as they came to call those who study physiological processes at the level of the ion channel of the neuronal membrane. Much attention was devoted to the problem of regulation of intercellular processes by secondary messengers transferring signals from the membrane to the cytoplasm. One of the most important messengers is the calcium ion, whose role is being studied at Kiev under the leadership of P.G. Kostyuk. He mentioned in his report that as a result of their unique physicochemical characteristics, calcium ions are capable of combining with complex organic molecules and thereby regulate the flow of intercellular processes. Unfortunately, there were very few reports on the role of yet another candidate for secondary messenger, i.e. systems of cyclic nucleotides. B.I. Khodorov, Institute of Surgery, Moscow, and G.N. Mozhayev, Institute of Cytology, Leningrad presented data and hypotheses on the structure and functions of ion channels in neuronal membranes, discussing the most significant achievements in this area and examining the prospects for future research on the functional architecture of ion channels. In discussing the nature of synaptic transfer, the majority of researchers leaned towards the interpretation of data from the standpoint of interaction of molecules and receptors, as well as the functioning of chemosensitive ion channels. O.A. Kryshtal, Kiev, Institute of Physiology, presented results obtained by a new method of "concentration skipping", whereby it is possible to bring the entire membrane of an isolated mammalian brain cell into contact with an altered external medium within 10-20 microseconds. Using this method, it is possible to "visualize" reactions on chemical modification of membrane receptors with specific reagents, opening up new ways to study the chemosensitivity of membranes. V.I. Skok, Kiev, Institute of Physiology, presented results on comparing the structures of selective cholinolytics with amino acid sequence and with the secondary structure of cholinoreceptive protein, which made it possible to clarify the structure of cholinoreceptors and demonstrate the role of calcium in its functioning. Discussions on the cellular bases of learning disclosed a wide range of neurobiological research. An impression was created that two languages were being spoken with no interpreters. On the one hand such expression as irradiation and concentration of stimuli and inhibitions, intercortical inhibition, informational switching of conditioned reflexes, memory tracks, and other similar terms brought silence from those studying physiological processes at the molecular level. On the other hand, there were almost no answers to questions on the molecular mechanisms of these processes because they have not yet been studied. Further research in this direction requires a qualitative leap in methodology. New methods are needed, such as the study of the plasticity of a tissue in which the cells form synaptic bonds; intercellular research on plasticity in brain cells surviving incisions; immuno-chemical methods, etc.

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